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# ILIAC PHLEGMONS;

SOME CONSIDERATIONS OF

ANATOMICAL AND SURGICAL INTEREST.

BY RUDOLPH MATAS, M. D.

Demonstrator of Anatomy Medical Department, Tulane University of Louisiana;  
Visiting Surgeon Charity Hospital, New Orleans.

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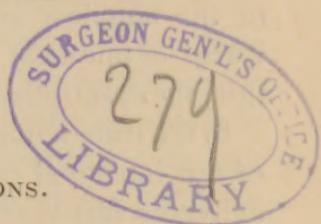
# Iliac Phlegmons; Some Considerations of Anatomical and Surgical Interest.

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## PART I.

### ANATOMICAL CONSIDERATIONS.



In order to understand the nature, distribution and course of the inflammations which lead to the formation of purulent accumulations in the iliac fossæ, and in order also to appreciate the various symptomatic manifestations which such inflammation may give rise to, it is indispensable—as a preliminary—to study the anatomical peculiarities of the more important structures which are found in this region. These anatomical considerations are equally indispensable for the rational surgical treatment of such troubles when they present themselves, as they so frequently do, in practice.

For our present purposes we will limit our study of the topographical features of this fossa to the discussion of the following points: 1st—the relations of the intestine and peritoneum to the iliac fossæ; 2d—the subperitoneal connective tissue; 3d—the distribution of the iliac fascia and its important surgical relations; 4th—the connective tissue under the iliac fascia, i. e., the sub-fascial or sub-aponeurotic areolar tissue.

I will limit myself to these four topics because I believe that their elucidation will sufficiently serve as a key to the ready understanding of the various inflammatory troubles which are clinically associated with this region.

1st. *The relation of the intestine and especially its peritoneal covering to the fossa.*

The special frequency with which abscess occurs in the right fossa in consequence of the *so-called* perityphlitic inflammations renders it imperative that we devote special consideration to this part of the large intestine.

The influence of tradition upon anatomical authority can be only too frequently discovered, even in the descriptions of the simplest and most demonstrable structures, in the works of our most original anatomical thinkers. And, of this, the description of the cæcum is a remarkable example.

In the truly admirable and original lectures on the anatomy of the intestinal canal and peritoneum in man, which were delivered last year (1885) before the Royal College of Surgeons of England, by Mr. Frederick Treves,\* this eminent anatomist first pointed to the decided discrepancy between the descriptions given in the texts and the real facts demonstrated by cadaveric examination. As a result of his careful examination of 100 subjects, he says: “The result of my investigation on this point is entirely at variance with the statements contained in anatomical text-books. The account given of the cæcum in works on anatomy would appear to be very ancient. It can be traced back from book to book through many literary generations; and, throughout its long history, it seems to have undergone little or no alteration. It is one of those descriptions that forms a real anatomical property, and that descends from one author to another with the precision of entail.” As an illustration of this, Mr. Treves quotes the description of the cæcum given in Quain’s Anatomy, a work which justly deserves its authoritative and commanding position as an anatomical text. Quain says: “The *intestinum cæcum* or *caput cæcum coli* is that part of the intestine which is situated below the entrance of the ileum. The cæcum

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Lectures on the Anatomy of the Intestinal Canal and Peritoneum in Man. By Frederick Treves, F. R. C. S., *British Medical Journal*, February 28, 1885, and subsequent numbers

is situated in the right iliac fossa behind the right wall of the abdomen. It is covered by peritoneum in front, below and at the sides; but behind it is usually destitute of peritoneal covering, and is attached by areolar tissue to the fascial covering of the right iliacus muscle. In this case, the cæcum is comparatively fixed; but in other instances the peritoneum surrounds it almost entirely and forms a duplicature behind it, called meso-cæcum."

This description of the cæcum is not confined to the descriptive anatomists only but is taught by the special anatomists as well, and I will cite the following extract from Tillaux's admirable work, "*Anatomie Topographique*" (1884), in which the anatomy of the iliac region is especially discussed and where the old error is maintained with still greater vigor. Tillaux presents a plate in which the loose areolar tissue behind the cæcum is especially represented, and says, that: The peritoneum does not surround the cæcum throughout its circumference, it does not form for it a meso-cæcum; this intestine is on the contrary, in direct contact with the subserous areolar tissue. It is owing to this arrangement that typhlitis is so readily spread to the connective tissue, which explains how it is that subperitoneal abcesses frequently empty into the cæcum.....

"The cæcum is therefore weaker in the posterior *fourth* of its circumference since it loses one of its coats at this point. It is also at this point, and on this account, that perforations of this intestine take place".....

Mr. Treves says: Accepting the definition of the cæcum given by the editors of "*Quain*" and by all other anatomists, I might state that in the 100 specimens examined, I have never found the posterior surface of the cæcum uncovered by peritoneum; I have never found it attached by areolar tissue to the iliac fossa; and I have not met with one single example of a meso-cæcum. I am much disposed to doubt the existence of such a fold as the last named."....

"When the abdomen is opened shortly after death, while the rigor mortis is still present, and before the intestines have become distended by decomposition, and so displaced, it will be found that the cæcum is usually lying upon the psoas muscle, and so placed that its apex or lowest point is

just projecting beyond the inner border of that muscle. In such a case, the cæcum will often be nowhere in relation with the iliæ muscle, or only its upper limits will be in contact with that structure. In defining these relations it is essential not to lose sight of the prime definition of the *caput coli*.

"In the great majority of instances, the apex of the cæcum corresponds with a point a little to the inner side of Poupart's ligament.

"In a great number of cases, the cæcum is entirely clear of both psoas and iliæ muscles, and hangs over the pelvic brim, or is lodged entirely within the pelvic cavity. In 18 instances out of 100, Treves found the cæcum lying within the pelvis or placed in contact with the upper surface of the bladder or uterus, or wedged in with the sigmoid flexure, or lying actually in contact with the left wall of the pelvic basin."

He ends by saying: "Now in every instance that I have as yet seen, the cæcum has been entirely enveloped on all sides by peritoneum, and has been free in the abdominal cavity."

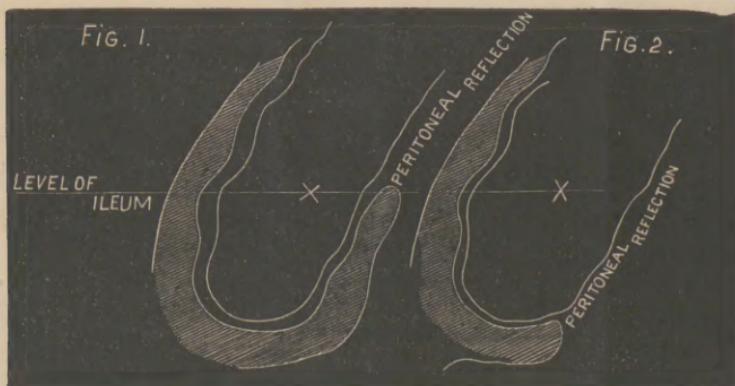


Fig. 1. Illustrates cæcum entirely invested by peritoneum, as taught by Mr. Treves.

Fig. 2. Cæcum partially invested by peritoneum, as taught in the texts.

This last important observation I believe I am able to confirm by the examination of over 25 subjects which I personally inspected in the anatomical rooms of the Medi-

cal Department of Tulane University, during the last session, 1885-6.

Even before my attention was directed to the subject by the perusal of Mr. Treves' lectures I had been frequently struck by the decided discrepancy between the texts and the real facts, but I must admit, however, that the respect for authority—the *magister dixit*—always led me to cling to the traditional description, and in my demonstrations caused me to allude to the too frequent contradictory evidence presented by the subject as an instance of an anomalous disposition of the parts. But now that Mr. Treves has so powerfully swept away the old legend, I will be pleased to recognize as a rule in the future, that which in the past I had taught as an anomaly.

Having decided, therefore, from the above evidence that the cæcum is *not* a fixed part of the large intestine, i. e., that it is not connected to the iliac fossa by loose areolar tissue or its posterior surface; that it is everywhere surrounded by peritoneum, and that it is suspended in the iliac fossa like a veritable *cul-de-sac*; we must now ask ourselves at what point then does the peritoneum leave it to reflect itself upon the abdominal wall?

Treves again answers the question with the authority vested upon him by his extended and careful observations.

“The line of reflection of the peritoneum, from the posterior wall of the cæcum on the posterior abdominal parieties varies somewhat. . . . In any case it is continuous with the left or under layer of the mesentery. The reflection is usually transverse, and is commonly placed between a line on a level with the summit of the iliac crest and another on a level with the anterior superior iliac spine. It is, as a rule, limited to the surface of the psoas muscle, or to that muscle and a small part of the adjoining part of the iliacus. *In a great majority of all cases the reflection in reality takes place from the posterior surface of the ascending colon and not from the cæcum*, so that not only is the cæcum entirely covered by serous membranes behind, as well as on all other sides, but the same complete covering is bestowed upon the commencement of the as-

ascending colon. Those who are impressed with the orthodox description of the cæcum will scarcely believe that the average measurement in a vertical line in the back of the colon, from the tip of the cæcum to this reflection of the peritoneum is four (4) inches. If from this be deducted  $2\frac{1}{4}$  inches for the average length of the cæcum, it leaves  $1\frac{3}{4}$  inches of the ascending colon entirely invested on all sides by peritoneum."

From the preceding anatomical considerations I believe that interesting and important deductions may be drawn which have some medical and surgical value.

The first point that can be safely made, if Mr. Treves and my own observations are to be accepted as the correct representation of an anatomical law, is that the relations of the cæcum, as far as its peritoneal envelope is concerned, are very much like those of the sigmoid colon. Therefore, the reason urged by many writers for the greater liability of the *right* iliac fossa to contract phlegmonous inflammations, on account of the direct exposure of the connective tissue of this fossa to intestinal contact, is in a great measure fictitious and the term *paratyphlitis* which was applied first by Oppolzer, (1864) Bossard (1869), and others to the inflammations which primarily originated in this theoretical *subcæcal* areolar tissue are altogether the outcome of the traditional and incorrect description of the cæcum already noticed. In the light of these anatomical data we would also repudiate the term *perityphlitis* if used in the generally accepted sense which makes it synonymous with *paratyphlitis*. As an instance of this usual but erroneous application of the word *perityphlitis* I would cite the definition given by Dr. R. P. Noyes, the author of a masterly essay on this subject, and who says: "By *perityphlitis* we understand an inflammation of the cellular tissue situated behind the cæcum and lying between it and the iliac fascia." If the word *perityphlitis* were used in the German sense, as Virchow first applied it to periuterine inflammations, *i. e.*, only to indicate inflammations of the serous investment of an organ, there can

certainly be no objection to the word, but if used synonymously with *paratyphlitis* then we cannot accept it, for we cannot, consistently with our present anatomical data, believe the latter condition to exist. If the term *paratyphlitis* is used to designate the subperitoneal iliac cellulitis which so frequently supervenes in the course of typhlitic inflammations then it is employed in a different manner from that originally intended by Oppolzer, Bossard and others, for there is not, as they believed, a retro-cæcal atmosphere of connective tissue which is the *primary* seat of inflammation.

I would lay stress upon this, because most clinicians and writers on this subject appear to emphasize the point that the greater preponderance of right iliac to left iliac inflammation is due in a great measure to the phlogistic susceptibility of this loose subcaecal atmosphere of areolar tissue—a theory that could certainly be very much impaired by the anatomical data already given.

It has been claimed also, that owing to this lack of serous investment on its posterior surface, the cæcum is frequently perforated by perityphlitic abscesses which discharge their contents into and through the bowel.

I am very positively convinced that this, like many of the anatomical reasons thus adduced to account for the relation between typhlitis and iliac phlegmons, are based on incorrect or imperfect anatomical notions.

But it may be asked, if inflammation of the cæcum is not spread to the subperitoneal connective tissue of the iliac fossa by direct propagation from the mass of connective tissue behind, and immediately continuous with it, what, then, is the route by which typhlitis does cause such phlegmonous inflammations? I believe that the question can be answered rationally by the results of post-mortem examinations.

It is the rule to find in all cases of iliac phlegmon, examined post-mortem, the results of *perityphlitis* or otherwise, marked evidence of localized, if not general, perito-

nitis. Jaccoud says: "No matter where an iliac phlegmon may be primarily seated (i. e., whether it be seated immediately under the peritoneum, or under the iliac fascia), it is pretty certain to be accompanied by a more or less circumscribed peritonitis." Grissolle says: "One-sixth of the patients affected with iliac abscess appear to succumb to this complication, peritonitis, which is especially fatal in the puerperal abscesses." Furthermore, if we consult the large records of post-mortem examinations of perityphilitic abscesses, we will find that the intestines, the cæcum and its appendix are, as a rule, bound down by adhesion to the iliac fossa and surrounding parts. It should be borne in mind that this peritonitis occurs irrespective of perforation of the bowel, etc. I have been present at the autopsies of three cases of perityphilitic phlegmon in the course of my medical career and in each of the cases very marked evidences of adhesive peritonitis existed.

The result of this localized peritonitis appears to be, that in cases of true perityphlitis or of inflammation of the appendix cæci, the bowel is agglutinated very early in the history of the disease, to the peritoneum which lines the iliac fossa. The intestine is thus brought down and firmly fixed to the fossa in a manner which brings it into very close relation with the sub-peritoneal cellular tissue which is soon attacked and breaks down into suppuration. This I believe is the common way by which the so-called perityphilitic abscesses are formed, but as is well attested by an interesting observation of Husson and Dancé (1826), the sub-peritoneal cellulitis may start behind the beginning of the ascending colon where a lax bed of connective tissue does as a rule exist, and from this point it is easy to understand how an inflammation may readily spread to the connective tissue of the iliac fossa. In the case reported by Husson and Dancé, the whole connective tissue had melted down into pus and had dissected off, to a great extent, the peritoneum from the colon and cæcum and had diffused itself throughout the iliac fossa.

But if there is any doubt as to the manner in which cæcal inflammations are propagated to the subperitoneal connective tissue of the iliac fossa, there can certainly be no possible doubt as to the mode by which the inflammations of its appendix, are propagated. It is manifest that the phlegmasiae of the diverticulum cannot spread by a subperitoneal cellulitis, as there is no loose connective tissue anywhere about the appendix. In such cases the intestinal inflammation must be initiated by an adhesive peritonitis which glues down the bowel and its diverticulum to the underlying peritoneum of the iliac fossa and causes thereby a secondary cellulitis of its connective tissue.

This, I believe, is the invariable rule in all cases of iliac phlegmon due to disease of the appendix vermiciformis. I have read and collected quite a number of reports of autopsies on such cases, and in each, I have always noted the peritoneal adhesion above described. I have before me an old number of the New York Medical Record of March 2nd, 1867, which contains an account by Dr. G. H. Wynkoop, of New York, of the post mortem appearance of an appendix vermiciformis which two years previously had been the seat of abscess and had been operated on by Prof. Willard Parker. In this case, the adhesion of the cæcum and its appendix to the iliac fossa and abdominal wall, as above noted, are very clearly confirmed. In further support of this view, I am pleased to add that Drs. Sands\* and Kelsey† of New York, expressed a similar opinion in 1879 and 1878 respectively.‡

I will not stop to consider the many interesting theories and observations that have been advanced to explain the greater tendency to a localization of enteric inflammation in the cæcum in preference to other parts of the large intestine. Many of the reasons for this preference are obvious on anatomical grounds alone, but a great many points

\* New York Medical Record, 1879. xiii 5.

† American Journal Medical Sciences, 1878.

‡ A very interesting specimen from a case of elongation and abnormal fixation of the appendix attended by perforative peritonitis, was presented to the New York Pathological Society, March 24, 1886, by Dr. Waldenstein which I believe plainly supports the view above sustained.

concerning the relations between typhlitic inflammations and iliac abscesses are still involved in doubt and obscurity. As it is not my purpose to enter into any etiological considerations, I will simply refer the reader to some of the various authors who have carefully investigated this subject. Among these I would especially cite the works of Husson & Dancé,\* Meniere,† Grissolle,‡ Dupuytren,§ Velpeau,|| Monneret & Fleury,¶ Bartholow,\* Oppolzer,† Déspres,‡ Blachez,§ Jaccoud,|| Noyes,¶ and Whittaker,\* A. B. Paultier,† who devote special attention to this part of our subject, and who discuss the various doctrines that have been held since 1758, when the first ideas on iliac inflammations glimmered through the darkness of the period in the writings of Ludwig‡ and LeDran.§

In considering the relations of iliac inflammations to the anatomy of the intestinal canal it is impossible to omit, if only with the object of impressing its importance—the immense significance of the appendix vermicularis as a casual factor in the history of such inflammations. The observation that the so-called perityphlitic abscesses have been so often traced to diseases of this diverticulum has led to a closer study of its anatomical relations, and has led to the discovery that this organ is subject to a great variation in size, shape and situation, which, according to the extensive

\* Husson & Dancé, *Mem. sur quelques engorgements inflammatoires, qui se developpent dans la fosse iliaque droit*, Rep. Gen. d'Anatomie et de Physiologie, iv; 1827.

† Meniere, *Mem. sur les tumeurs phlegmoneuses occupant la fosse iliaque droite*. Arch. Gen'l de Médecine, 1828.

‡ Grissolle, *His. des Tumeurs Phlegmoneuses des Fosses Iliaque*. Arch. Gen'l de Médecine, 1839.

§ Dupuytren: *Lecons Orales*, t. iii; Paris, 1836.

|| Velpeau: *Lecons Orales*, t. iii; Paris, 1844.

¶ Monneret et Fleury: *Compend. de Médecine*, t. viii; Paris, 1846.

\* R. Bartholow: *On Typhlitis and Perityphlitis; on Diseases of the Caecum and Appendix Resulting in Abscess in the Right Fossa Iliaca*. (Am. Jour. Med. Sciences, 1866.)

† Oppolzer: *Pathology and Therapy of Subperitoneal Abscess*, Wiener Mediz. Woch., 1864. Translated in French journals.

‡ Depres: Art. "Iliaque," *Nouveau dict. de Médecine et Chirurgie Pratiques*, t. xviii, Paris, 1874.

§ Blachez: Art. *Caecum*, Dechambre's Dict., Vol. II, 1st Series.

|| Jaccoud: *Pathologie Interne*, vol. ii, p. 221-241.

¶ Noyes: *Transactions Rhode Island Medical Society*, 1882, Article *Perityphlitis*.

\* Whittaker: *Typhlitis, Perityphlitis and Paratyphlitis*. American System of Medicine (Pepper), vol. 2.

† Contribution à l'étude de la Typhlite et de la Perityphlite, O. Doin; 1875. Paris.

‡ Ludwig: *Diss. de Abscessu latente*; Lepis, 1758. quoted by Jaccoud.

§ Ledran: *Consult. sur la plupart des Maladies que sont du Ressort de la Chirurgie*; Paris, 1765. Quoted by Jaccoud.

researches of Matterstock (1880) and Kraussold (1881) are the real predisposing factors to the inflammatory and perforating lesions of this organ which lead to iliac suppurations. Treves (1885) has also added to our stock of information on this subject, which confirms still further the importance of these anatomical aberrations of the appendix in the etiology of perityphlitic troubles. I cannot pause to consider the anomalies, interesting as they are in connection with this study, but must refer the reader to Ziemessen, \*, Whittaker, † and Treves, ‡, where a detailed account is given of them by these authors. I would, however, dwell upon a few points, which I believe have not been sufficiently appreciated and should be generally known. It should be remembered that the growth of the appendix is irregular and uncertain, and that it appears to be influenced in no way by the development of the main intestinal tube. It would seem that it may attain its full length quite early in life, as in an instance recorded by Treves, in which an appendix four and three-quarter inches in length was found in the body of a child aged 3 years.

The width of this process is more constant and is indeed liable to very few fluctuations. In another remarkable case described by Treves, a male subject 37 years of age, this observer found the appendix to be four inches in length, and a little over *half an inch in width*.

It should be remembered also, that the valvular fold of mucous membrane known to some anatomists as the valve of Morgagni which appears to guard the orifice that connects the cavity of the diverticulum to the cæcum varies in size according to the age of the subject. This fold is most marked between the ages of 8 and 12 years, and then it usually narrows the orifice to  $\frac{1}{2}$  or  $\frac{1}{3}$  of the calibre of the tube; as a rule this fold is little pronounced in the first years of life and is atrophied in old age. In the foetus, according to Marc See there is no fold at all and the cavity of the ap-

\*Ziemessen, *Cyclopaedia of Practice of Medicine*, Vol. iii. *Constrictions, occlusions and displacements of the Intestines* by Otto Leichtenstern.

†Loc. cit.

‡Loc. cit.

pendix which at this period is commonly filled with meconium communicates freely with the cæcum. Great clinical importance has been attached to this fold by Gerlach, and it may be, as he claims, that greater liability to contract disease of the appendix at the time of life when this valve is most marked, is due to the existence of this contracting fold.

Matterstock quotes Züngle who observed in 59 cases in the Hamburg Hospital, whole or partial obliteration of the appendix 30 times; catarrh and old fecal concretions, 43 times; abnormal adhesions, 12 times, and tubercular ulceration (without perforation) 11 times. *Toft claims as a result of 300 personal investigations, that every third person between the ages of twenty and seventy, shows the traces of present or past inflammation, and that actual ulceration existed in 5 per cent. of all bodies examined.*

Kraussold declares that this percentage is rather too low than too high, and adds that among his patients who were mostly phthisical, it was remarkable how extraordinarily often the whole vermiform appendix was the seat of encroaching ulcer. The discovery therefore, that the appendix is so frequently the seat of stricture and especially ulceration in consequence of dysentery, typhoid fever, syphilis and more especially of tuberculosis, marks a most important era in the etiological history of this disease. Clinicians who have been struck with the frequency with which typhlitis and perityphlitis occur in tubercular subjects find in this discovery a very satisfactory explanation of this very remarkable coincidence.

Whittaker, in his very able article on this subject in Pepper's American system of Medicine, (1886,) to whom we are indebted for much of the preceding information, calls attention to an anatomical factor in explanation of the frequency of ulceration and inflammation of this structure, in that its walls are so sparsely endowed with muscular tissue as to render it unable to empty itself of the

virus or germs of disease which enter it from the comparatively stagnant reservoir above it,—the cæcum.

## *II. The Sub-Peritoneal Areolar tissue of the iliac fossa.*

Immediately under and behind the peritoneum there exists an extremely abundant areolar layer which is loose, easily penetrated and which contains usually little fat. It is uniformly continuous with the subserous connective tissue of the pelvic basin, and, in the female, it is particularly so through the cellular layer of the broad ligaments. With this direct continuity of tissue in view, it is very easy to understand how readily pelvic cellulitis will spread to the iliac fossa and how it is that the inflammations which are frequently developed in these ligaments during the puerperal state are propagated with such remarkable rapidity to the false pelvis. It is to this particular form of iliac inflammation that the French have given the name of Subperitoneal Iliac Phlegmon.

I will state incidentally that in the last few years the relations between the pelvic and iliac connective tissue and their influence in the propagation of pelvic inflammations to the iliac fossæ have received new and strong experimental proof through the evidence adduced by German investigators. Bitas, König and Schlessinger performed a series of very interesting experiments, which not only confirmed the clinical fact that pelvic inflammations are most liable to attack the iliac fossæ, and there give rise to subperitoneal abcesses, but they were also able to trace accurately the anatomical route that would in all likelihood be taken by such inflammations. These experimenters injected by means of fine canulæ fluids, such as colored glue, into the peri-uterine tissues of puerperal and non-puerperal bodies. König found (a) that fluids injected into the region around the *fundus uteri* and uterine portion of the Fallopian tubes, first pass upwards into the iliac fossa to reach the crest of the ilium, then downward toward Poupart's ligament, and finally into the *pelvis minor* or true pelvis, (b) fluids injected into the

*peri-uterine* tissues, in the neighborhood of the internal os, first fill the retro-peritoneal connective tissue of the *pelvis minor*, then follow the round ligament towards Poupart's ligament and ascend in a backward direction into the iliac fossa; (c) that when the injection is made near the lower portion of the posterior surface of the uterus, the fluid first flows into the *cul-de-sac* of Douglas and thence rises into the iliac fossa.

Schlessinger (1878), although in the main agreeing with König, differs with him in the following two points: He says, (a) when fluid is injected in the neighborhood of the fundus uteri, it first passes into the iliac fossa, but thence it does not descend into the true pelvis, as König observed, but it ascends, running up the anterior abdominal wall: (b) from the broad ligament the fluid finds its way into the iliac fossa and thence upward toward the kidney running in the mesentery of either the ascending and descending colon. Schlessinger further makes the interesting statement that his pericervical injections filled the pericervical tissues, but that they never produced a tumor which could be felt above the *symphysis pubis*.

C. Fenger, of Chicago, to whom we are indebted for the preceding extracts, repeated these experiments in 1884, using milk as the injecting fluid, and apparently confirmed these results, though the details of his work are not given in his published remarks on the subject in the interesting discussion on pelvic abscess which took place in the Chicago Gynecological Society, February 19, 1886. The preceding experiments, however, will serve to make plain the route taken by puerperal pelvic inflammations and will also impress the point that all acute purulent accumulations which are found in the iliac fossa, which are directly traceable to puerperal influences are almost to a certainty *sub-peritoneal abscess*. This I emphasize in order that the difference between the subperitoneal and *sub-aponeurotic* abscess may be still better appreciated.

Subperitoneal iliac abscesses are, to define them, purulent accumulations in the iliac fossa situated between the peri-

toneum above, and the iliac fascia below. It is now necessary to understand the value of this definition from the practical point of view; and, in order that the exact relations of such abcesses to the peritoneum and subjacent tissues be better understood the following schematic representation is introduced to help our purpose.

Fig. 3.

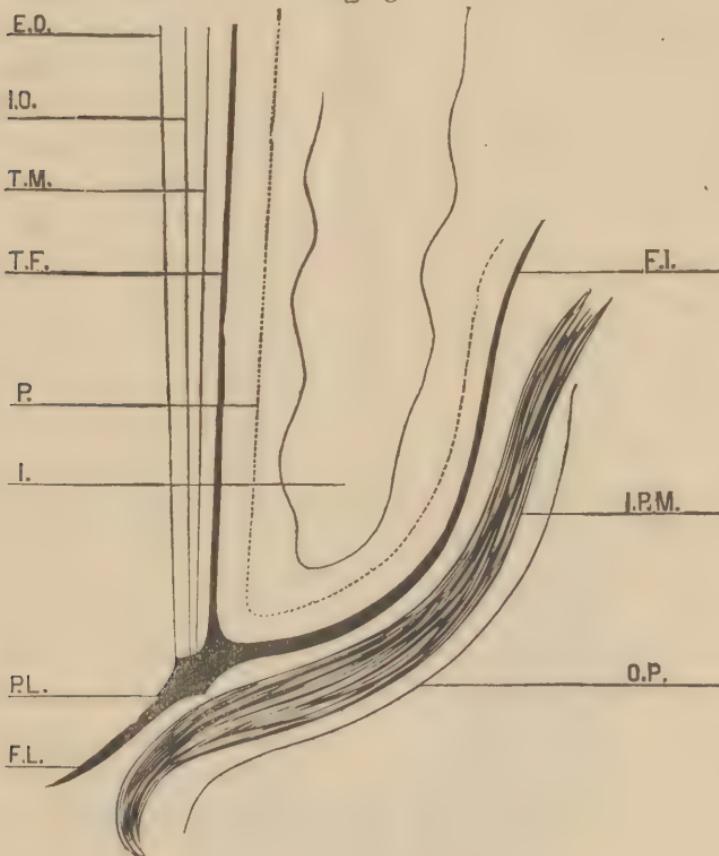


Fig. 3. Vertical section of right iliac fossa (schematic) on level with outer  $\frac{1}{3}$  of Poupart's ligament.

E. O. External oblique muscle.  
I. O. Internal oblique muscle.  
T. M. Transversalis muscle.  
T. F. Transversalis fascia.  
P. Peritoneum.  
I. Intestine.

P. L. Poupart's ligament.  
F. L. Fascia lata.  
F. I. Fascia iliaca.  
I. P. M. Ilio-psoas muscle.  
O. P. Osseous plane.

In Fig. 3, a vertical section of the right iliac fossa is represented (the deductions from the schema applying equally as well to the left fossa).

It is mainly intended to demonstrate how the iliac fascia unites with the transversalis fascia on a level with Poupart's ligament. The peritoneum (dotted line) descends in front of the iliac fascia till it reaches the crural arch, arrived at this point it is reflected upward to cover the posterior surface of the transversalis fascia. The peritoneum in the iliac region is *nowhere* in direct contact with either the transversalis or iliac fasciæ, but is *everywhere* separated from both these structures by an appreciable thickness of subserous areolar tissue. This subperitoneal areolar tissue is the seat of inflammation in subperitoneal abscess. As already stated in the beginning, it is uniformly continuous from the iliac fossa to the abdominal wall, hence it is not surprising that the exudation in iliac abscess should ascend behind the transversalis fascia *above* Poupart's ligament.

This is in reality the *classical* manner in which acute iliac abscesses (phlegmons) present themselves. An abscess of this kind may, from the anatomical data already given, either ascend into and spread about in the lumbar region; it may *descend* into the pelvis or into the thigh, or *ascend* which is the rule, *above* the crural arch. If it takes the latter course it soon forms a tumor, which can be readily felt above Poupart's ligament in which pus can be detected by an exploring needle. When pus is formed under the peritoneum it necessarily displaces this membrane upward and dissects it from the iliac and transversalis fasciæ as is shown in Fig. 4. In this manner a large purulent focus may be formed in the iliac fossa, which is bounded in front by the *transversalis fascia*, behind by the *iliac fascia*, below by the crural arch and above by the peritoneum. In opening such abscesses when felt above Poupart's ligament the incision should be made parallel with this ligament and over the seat of fluctuation. Such an incision should be made on the outer side of the epigastric artery, the course of which is indicated by a line drawn from the middle of Poupart's ligament to the umbilicus. In cutting, the knife will pass through, 1st, skin; 2d, subcutaneous areolar tissue; 3d, the aponeurosis of the external oblique;

4th, the internal oblique; 5th, the transversalis muscle, and 6th, the transversalis fascia. After which it will immediately penetrate into the purulent cavity which is situated in the subserous areolar tissue. The operator should not apprehend the wounding of the peritoneum in such cases, i. e., especially if fluctuation can be felt above Poupart's ligament, for this membrane has been separated by the inflammatory exudate from the transversalis fascia and is removed far away from danger. This line of incision together with the anatomical strata traversed by the knife will be made still plainer by the accompanying diagram.

Figure 4.



Fig. 4. Scheme intended to represent the limitations of *subperitoneal* and *sub-aponeurotic* abscesses.

The diagram represents the peritoneum lifted above Poupart's ligament and removed from dangerous proximity to

the abdominal parietes. It also exhibits the iliac fascia acting as a barrier between the subperitoneal and sub-aponeurotic phlegmons.

The inflammations which affect the subperitoneal connective tissue end usually in suppuration. They may, notwithstanding this, terminate in induration. In such a case a more or less voluminous mass, of a hard, resisting character, is usually found filling the fossa, which can be readily outlined through the thickness of the abdominal wall. These indurated masses sometimes attain enormous proportions, rising as high as the umbilicus (Tillaux), and assume occasionally an incredible degree of hardness; these indurations remain for a long time stationary, but absorption and resolution progress rapidly when once begun. "Many times," says Tillaux, "have I made deep and large incisions into these masses until their centre was exposed, with marked benefit to the patient."

Inflammation of the subserous areolar tissue of the iliac fossa, particularly when it results from the spreading of a like inflammation in the broad ligaments may follow, but much more rarely, a different route from the one above indicated.

It will be remembered that the external iliac trunks (artery and vein) constitute in the recent subject the inner boundary of the iliac fossæ; where they lie surrounded by this subperitoneal areolar layer. It is, therefore, possible for iliac pus to find its way into the sheaths of the vessels instead of presenting above the crural arch. The pus may escape out of the abdomen into the thigh through the femoral canal, and appear at the saphenous opening simulating femoral hernia for which it has been repeatedly mistaken.

Tillaux has observed a very interesting case of this kind.

There are other situations which the pus of subperitoneal iliac abcess may select to escape from the iliac fossa, such as the great sacro-sciatic foramen with the abcess pointing in the gluteal region; in the weak spot known as the triangle of Petit, which is an excellent situation for incising

such abscesses ; they may point posteriorly, or the pus may find its way to the hip joint, or into the intestines, bladder, urethra or perineum in male ; or, in the female, they may empty into the vagina, or the labia, through the canal of Nuck ; but such terminations are uncommon and occur only in cases in which the pus has been forced by abnormal anatomical circumstances to lose its way in these unfamiliar routes and, especially, where it has ulcerated the underlying iliac aponeurosis.

### *III. and IV. The Iliac Fascia and its Topographical Relations.*

“ The dominant feature of the topographical anatomy of the iliac fossa,” says Tillaux, “ is the disposition of the iliac fascia.”

This aponeurosis indeed impresses upon this region a special character which is exhibited in the peculiar course and distribution which it usually gives to the purulent collections so often met with in this region. It is therefore necessary to review at least cursorily the attachments and relations of this fascia in order that the course of iliac suppurations, and the peculiar phenomena which they often present may be more easily explained.

The iliac fascia also known as the lumbo-iliac aponeurosis (Sappey), is an aponeurotic leaflet which covers the psoas and iliac muscles throughout their whole course. It forms with the lumbar vertebræ in its upper part and the venter iliæ below, a half fibrous and half osseous sheath which lodges the psoas and iliacus muscles—this corresponds to the iliac canal of Velpau. The thickness, density and resistance of this fascia increase progressively from above downward. It is exceedingly thin, reduced almost to an imperceptible veil in the superior part of the psoas, it assumes a more fibrous character in the lower half of this muscle on a level with the iliacus muscle, and when it reaches the crural arch it assumes all the characters which distinguish the typical aponeurosis. Though it is so thin in its upper portion as to be differentiated with great difficulty from the underlying connective tissue which covers the psoas, it may under suitable inflammatory stimulus become sufficiently thickened to offer a barrier to supra-

aponeurotic suppurations and vice versa. It is attached above to the ligamentum arcuatum internum of the diaphragm, and on the inner side (of the psoas) (1) to all the lumbar spine by a series of arched processes to the intervertebral substances and prominent margins of the vertebræ. Further down (2) it is attached to the base of the sacrum, and still further (3) to the superior strait of the pelvis where it is blended with the periosteum and pelvic fascia, and where it receives the insertion of the psoas parvus muscle. Externally, and to the outer side of the psoas, it is continuous with the lumbar aponeurosis; from the arcuate ligament above to the ilio-lumbar ligament below and when it reaches the iliac fossa it is attached to the inner lip of the iliac crest where it unites with the transversalis fascia. On a level with the bend of the hip or the ilio-femoral flexure, it is united most intimately with the transversalis fascia where it assists in forming Poupart's ligament which is a composite fibrous cord formed by the interblending of these two fasciæ with the aponeuroses of the external and internal oblique and transversalis muscles, and not a simple cord formed by the thickening of the external oblique only, as taught by some authors. But this intimate union with the transversalis fascia only exists in that part of Poupart's ligament which is situated on the outer side of the femoral vessels or according to Dupuytren only 8 or 10 lines from the anterior superior spine of the ilium where it leaves the transversalis fascia and passes under the vessels, forming in this manner the posterior wall of the femoral sheath and in doing this it covers the ilio-psoas tendon which it accompanies to its termination.

Internal to the femoral vessels it is connected to the pectineal line and is continuous with pubic portion of the fascia lata. (Gray.)

This aponeurosis is connected to the muscles, which it covers by an extremely loose areolar tissue. Upon the psoas this tissue offers but little adipose admixture, but upon the iliacus it contains more fat, which in certain subjects may be deposited in sufficient quantity to form a thick cellulo-adipose layer. This sub-aponeurotic connective tissue may be the seat of a primary acute cellulitis, which may not affect the muscles: but, as we will see further, such simple cellulitis, uncomplicated by ilio-psoitis, is rare.

It is evident from the preceding description that the iliac fascia, when its attachment to the iliac bone and lumbar vertebræ are considered, forms a very resisting encasement for the psoas and iliacus muscles, the manifest purpose of which is to protect the parts lying in immediate relation with or about these muscles from the disturbing effect which their contractions might exercise.

It is plain, also, that in inflammatory affections about these muscles, nature, evidently not satisfied with this encasement, still further protects the sensitive parts about them, even from a minimum of disturbance, by completely suppressing their functions, as is shown by the fixation of the thigh.

It should be remembered in connection with the relations of the iliac fascia, that the external iliac artery and vein, and their epigastric and external circumflex branches; the ilio-lumbar artery, the spermatic in the male, and utero-ovarian vessels in the female; the ureter and a chain of lymphatics which accompany the iliac vessels lie, all, in the loose connective tissue which is interposed between the peritoneum and this fascia. These relations are important, because some of the peculiar phenomena which characterize the infra-peritoneal or supra-aponeurotic phlegmons are readily accounted for by them, and may assist in the differential diagnosis of these abscesses. Thus, a phlegmon of the left iliac fossa which recently came under my observation in the service of Prof. Souchon, Charity Hospital, gave rise to a most marked œdema of the left lower extremity, due evidently to the compression exercised by subperitoneal exudations on the left iliac vein. This was confirmed by a post-mortem examination.

The ureter may be likewise compressed by exudation about this channel and be followed by all its pernicious consequences.

Again, it should never be forgotten in examining suspected cases of iliac abscess, that a protopathic adenitis may affect the deep chain of iliac lymphatics, and may give rise to a well characterized but deep seated tumor in

the iliac region which may simulate very deceptively a sub-peritoneal phlegmon as pointed out by Van Lair, in his valuable monograph on the subject.

Though the psoas and iliac muscles are united below in a common tendon they are separate and distinct at their origin, the psoas ascending as high as the twelfth dorsal vertebra, whilst the limits of the iliacus are outlined by those of the fossa. Between these two muscles lies the anterior crural nerve. This is an item worth remembering, as we shall see further on.

As the tendon of the iliacus and psoas passes out of the pelvis into the thigh to reach its final attachment—the lesser trochanter of the femur—it glides over a large serous bursa which often communicates with the joint and which may sometimes become inflamed and may give rise to symptoms that may lead to serious diagnostic errors.

It should be remembered that the psoas contains within its substance the branches of the lumbar plexus, and the secondary branches which spring from them. This anatomical fact is of some value from the diagnostic standpoint for it is manifest that if there are symptoms (in cases of doubtful iliac abscess) which point distinctly to irritation or compression of these nerves, the case must be one of sub-aponeurotic phlegmon and not a supra-aponeurotic abscess, for above the iliac fascia there are no nerves. Such symptoms as commonly seen in the infra-aponeurotic phlegmon are extreme retraction of the thigh with a *contracture* of the flexors, violent neuralgic pains which may shoot down the iliac crest to the nates, if the abscess is high up; or descend to the genitals, groin, down the thigh to the toe, or in other directions according to the nerve specially affected. Another symptom which has occasionally been noticed, is atrophy of the muscles of the thigh, and especially of the quadriceps extensor cruris. I have observed this symptom in the case of an elderly gentleman who suffered a long time with an iliac phlegmon of the right fossa that was finally opened by incision in the outer half of Scarpa's triangle. In this case there was a great deal of exudation in the

iliac fossa, and I have no doubt that the marked atrophy and pains he suffered in the affected limb were attributable to irritation and pressure on the nerves from the exudate.

It is well known that the muscular fibres which compose the psoas, are exceedingly fine and delicate, and it is owing to this anatomical peculiarity that they are particularly liable to rupture and especially prone to inflammation.

When psoitis occurs, the inflammatory process runs quickly into suppuration. In such cases rapid disintegration of the muscle takes place, which fills the ilio-psoas sheath with a peculiar, reddish grumous pus, in the midst of which lie isolated and denuded the nerves of the plexus.

It should be borne in mind that violent over action of the psoas is not an infrequent cause of rupture of the fibres of this muscle and in consequence, a frequent cause of sub-aponeurotic suppuration. Dancing, fencing and certain gymnastic exercises are very often the causes of acute psoitis and an inquiry as to the habits and exercises of the patient should never be omitted in cases where such suppuration is suspected. It is well known, as Harrison Allen (*System of Human Anatomy*) remarks, that after death, the fibres of the psoas are often lacerated by rough handling of the subject. It is possible, therefore, that the muscle may be lacerated by a direct blow even when at rest. Petrequin reports a case in which simple over action of the psoas from excessive dancing was the presumed cause of an acute abscess.

The writer has been informed that a prominent homœopathic practitioner, who is still well remembered in the Creole circles of this city, died in consequence of a very extensive sub-aponeurotic phlegmon which originated in a psoitis due to a laceration of the psoas, consequent upon violent action of this muscle in fencing. In this case, the patient felt a sudden twitch and sharp pain in the groin just as he plunged, and from that day he commenced to suffer with the suppurative inflammation that culminated in his death.

In a case observed by M. Perrochaud (*Bulletin de la*

*Societé Anatomique de Paris, 1837, p. 207*), an acute abscess was formed altogether at the expense of the psoas, iliacus, and quadratus lumborum muscles, which were in a great measure liquefied. What remained of these muscles was transformed into a whitish, fibrous substance, which presented at some points a remarkable density.

Inflammation of the ilio-psoas muscle usually imparts to the lower extremity a peculiar posture. Almost all authorities are agreed on the point that in psoitis the thigh is thrown into a state of "*flexion, abduction and external rotation.*" P. Tillaux,\* J. Pearce Gould.†

This posture, if a constant accompaniment of psoitic inflammation, should prove a valuable aid in the diagnosis of infra-aponeurotic abscesses. Such a position would correspond to the attitude of the lower limb that would result from a contraction of the psoas. It appears that in the supra-aponeurotic abscesses—at least such was the case in three patients that recently came under my observation, and in whom I had no reason to suspect a real myositic psoitis—the position is changed to the reverse, i. e., flexion, adduction and internal rotation. This was especially marked in the case of a little country girl who was brought to me from Plaquemines parish, and whose case was singularly obscured as regards the diagnosis of iliac phlegmon, by the fact that the patient complained only of the serious inconvenience and ungainly appearance given her by the abnormal attitude of her right thigh and leg. In this very interesting case, the thigh had in the course of three weeks become extremely *flexed, adducted and inwardly rotated* by a rigid and unyielding *contracture* of the adductor group of muscles. The attitude of this limb on casual inspection appeared more like the third stage of coxalgia than any other condition excepting, perhaps, a dislocation backwards on the dorsum ilii.

I introduce here a cut from a sketch of the patient, which

\* Op. Citat.

Surgical Diagnosis. H. C. Lea's Son & Co., Philadelphia, 1884.

represents the attitude of the limb, and which, I hope, will draw the attention of my readers to the study of posture as a diagnostic sign in iliac abscess :

Fig. 5.



Fig. 5 illustrates attitude of limb in flexion, adduction and internal rotation, in subperitoneal iliac phlegmon as observed in a patient who recently came under the observation of the author.

In this case, it was only after the most careful exploration of the right iliac region, under complete anaesthesia, that I detected after repeated explorations with the hypodermatic needle a purulent focus in the fossa, above Poupart's ligament. The pus that was removed in the exploration was creamy, laudable and inodorous.

This abscess was subsequently, (4 days after), opened freely by an incision above Poupart's ligament, and in less than a month, the remarkably deformity of the lower limb had disappeared.

In this case the pus did not partake of the character of psoitic pus.

From this and two other observations that I cannot detail for want of space, I would conclude that in subperitoneal or in simple perisoitic phlegmons the limb is thrown into the *flexed, adducted, and inwardly rotated* attitude.

I have not had the opportunity of examining true psoas abcess whether acute or chronic and consequently cannot express any opinions based upon personal observation, but if we are to accept the statements of all the best authorities we must conclude that real psoas abcess is characterized by a peculiar attitude and that this is the reverse of that just described.

In the position noticed in my patients, the thigh was always flexed and adducted, and in one instance absolutely fixed by the *contracture* of the adductors. In this position the thigh is immobilized, but without any participation of the ilio-psoas, for in this position, we would suppose this muscle to be in a state of relaxation.

In the classical psoitic posture, with the limb flexed, abducted and externally rotated, we must suppose the ilio-psoas to be in a state of contraction or of contracture.\*

But why should this difference exist? This is certainly difficult to answer but I think the query can be fairly met by supposing that in the case of subperitoneal abcesses, as for instance in the perityphlitic phlegmons, or in the inflammations which involve only the connective tissue under the iliac fascia, and not the muscular fibres, the irritation about the psoas is simply sufficient to excite a reflex contraction of the adductors with fixation of the thigh in order to attain nature's great object—rest to the inflamed parts—by immobilizing the limb and relaxing the psoas. When the psoas itself inflames it is probably that a perineuritis is set up in the nervous filaments which supply this

\*Contracture of the psoas may be excited by the presence of pus either within or along-side of the muscle, (Harrison Allen.) In perinephritic abcess the value of this sign was determined by Bowditch, (*Boston Med. and Surg. Journal*, May 4, 1868); while Benjamin Lee (Trans. Med. Society, Penna.), 1876, 539, invited attention to it in psoas abcess pointing at the g. loin. But this subject has not been sufficiently investigated, particularly as to the attitude.

muscle, and that a condition of spastic rigidity is thereby set up which explains the *abducted* attitude of the limb. In the latter case we must suppose that the irritation is too intense and too direct for Nature to accomplish her object.

Of course this is mere theory, but it is hoped that the attention of careful clinical observers will be more largely directed towards this subject and that a stable and correct explanation of the postural phenomena may be given by more extensive and careful research.

From the details above given, we can now understand that the inflammations of the iliac fossa may develop in, and be confined to two very distinct spaces. The first of these would be in the subperitoneal areolar tissue and the second in the sheath of psoas and iliacus or in the areolar space immediately under the iliac fascia. Abscess in the first situation is known as the true phlegmon of the iliac fossa by French authors and usually corresponds with the more familiar "perityphlitic" abscess of English and American writers. Abscess in the second situation is known as the subaponeurotic phlegmons of French and other continental writers or the acute psoas abscess of English speaking writers.

The pathogeny, symptoms, course, prognosis and treatment of these two affections are different and can be clinically distinguished by a careful examination of the patient, particularly if the case is seen at an early period in the career of the disease.

We must admit, however, with Malgaine, Dupuytren and Tillaux, that pus does not here always respect aponeurotic barriers any more than it does in other localities where, in spite of the most perfect anatomical limitations, it will follow erratic paths that have not been traced by nature; but it must be admitted that as a rule the iliac fascia acts as a partition which effectively separates these two forms of iliac suppuration.

Cold abscesses perhaps demonstrate this truth better than do the acute phlegmons; these chronic purulent forma-

tions, as is well known, result almost invariably from vertebral caries; they descend along the sheath of the psoas, and following the course of this muscle point below Poupart's ligament and on a level with the lesser trochanter. In such cases all the tissues above the fascia iliaca are as a rule thoroughly respected, and remain entirely unaffected, notwithstanding the fact that all the psoas and iliac muscles and other underlying parts may be entirely disorganized by destructive inflammatory action.

The pointing of the pus below Poupart's ligament would be the normal anatomical course taken by such abscesses (subaponeurotic) but pus if allowed to remain unmolested or if it meets any accidental impediments in its downward march towards the thigh, will carve for itself certain irregular by paths that are almost startling by their incomprehensibly circuitous route. Grissolle, Dupuytren and Velpeau were among the first to trace with precision and to make careful anatomical inquiries into these devious routes, and it would be interesting to recall and examine again with these writers some remarkable illustrations of the burrowing capacity of pus when originating in the iliac fossa or its neighborhood, especially since many of the teachings which have resulted from the admirable and conscientious investigations of our anatomical ancestors appear to have been entirely relegated to the chronicles of the past.

But outside of mentioning and referring the reader to the remarkable cases described by the above mentioned writers and by Vigla, Monnot, Burne, Corbin, Husson and Dancé and others that will be found in many special monographs, such as in Monneret and Fleury's admirable summary of this subject, I will leave this anatomical part of my paper to present to the reader what is doubtless more interesting and of practical utility, — the modern surgical treatment of acute iliac phlegmons.

## PART II.

## SURGICAL CONSIDERATIONS.

In inflammations of the iliac fossa, as in those of the pelvic cavity, the practitioner, after determining the nature and seat of trouble, must aim at either one of two objects: 1st, At resolution, if the patient is seen prior to suppuration, or 2d, in case the patient is seen when the latter event has occurred, at the evacuation of the pus at the earliest possible moment.

With regard to the first object, I will have little, if anything, to say, as in the present article it is my purpose to consider this subject almost exclusively in its surgical relations. It is well to note, however, that the prophylaxis of suppuration in the iliac fossa depends in a great measure: (1) on the *time* when the patient is seen, (2) on the recognition of the etiological factor in the case, and (3) in the particular seat of the inflammation.

It should be borne in mind that acute *subperitoneal* cellulitis in the male is due in 80 cases out of 100 to inflammatory diseases of the appendix vermiciformis, or of the cæcum, and that this in turn is due to either fecal impaction, ulceration or lodgment of a foreign body in the appendix.

It is plain, therefore, that the first endeavors should be directed toward the removal of the causative factor and the relief from these primary evils.

In the female, puerperal and other gynæcic conditions tend to the special propagation of inflammation from the pelvic areolar tissue to the iliac fossæ, and especially toward the left fossa, as is pointed out by Mèniere, Monneret, Fleury and others. Such forms of cellulitis must be treated under the same principles that guide the practitioner in the treatment of similar conditions in other localities. It is pretty certain, however, that once an inflammation has been started in subperitoneal or subaponeurotic connective tissue of the iliac fossa, it will matter little what treatment is followed—whether we cup or leech, blister or counter-irritate by local plasters or embrocations—the inflammation will run almost surely into suppuration.

This is equally if not specially true of inflammations which start in the connective tissue under the iliac fascia, which constitute the sheath of the psoas and iliacus, or when the inflammation begins as a primary myositis due to a strain or rupture of the fibres of the ilio-psoas muscle. In such cases the inflammation is still more deeply seated, and consequently still further removed from the influence of any local applications.

In the treatment of all forms of iliac cellulitis, whether the patient gives evidence of purulent infection or not, the surgeon must always explore the fossa for pus, even if attempts are being made to abort the inflammation by topical means. It is at this time that the hypodermatic syringe or the exploring needle of the aspirator proves of precious and inestimable value. If a non-fluctuating tumor is detected in the fossa, the needle should be driven into it and its substance explored for pus. If there is no localized tumefaction or fluctuation, then deep punctures should be made in at least three points: 1st, a puncture above Poupart's ligament close to the anterior superior iliac spine; 2d, below Poupart's ligament, in the outer half of the base of Scarpa's triangle, close to the anterior inferior iliac spine, and 3d, a puncture in the lumbar region in or about the space usually described as Petit's triangle, and which is bounded externally by the external oblique, internally by the erector spinae, and inferiorly by the iliac crest. The first puncture is especially intended to reveal subperitoneal or supra-aponeurotic inflammation (usually inflammation connected with the cæcum or its appendix); the second (below Poupart's ligament) will tend to detect pus if there is an infra-aponeurotic abscess; and the third will explore with special effectiveness the posterior part of the fossa.

Dr. William T. Bull, of New York, in his recent and exceedingly instructive paper read before the Practitioners' Society of New York, February 5th, 1886, states that he has "several times drawn pus from the iliac fossa through punctures made in the lumbar region downward and forward towards the middle of the fossa, when punctures

directly into the fossa or in the tumor occupying it were fruitless. A good-sized needle is indispensable (No. 3 or 4 of the French scale for urethral instruments) and a tight syringe. These punctures are harmless—we are all familiar with their value in diagnosis, but I would like to emphasize the advantage of making such thorough exploration as I have described."

Dr. Bull also claims and justly too, something more for the needle, and that is, "that it is the only trustworthy means of ascertaining the presence of pus. Both the general symptoms and the local conditions mislead us in this respect. There are patients who are attacked with high fever, severe pain, chills and even sweating, whose inflammation undergoes resolution; and there are others in whom the abscess reaches greater proportions with trifling disturbance.

To illustrate this point Dr. Bull quotes a case from a paper by Dr. R. F. Noyes,\* in which the formation of an abscess was indicated by chills, pointing, and a temperature of  $103.4^{\circ}$  F. The case terminated suddenly by absorption. There was no discharge from the rectum and no external opening. The reverse occurred in one of Dr. Bull's patients. In this case B. was lulled into a feeling of security by the absence of constitutional symptoms and allowed a week to elapse before making an exploration with a needle, while an abscess of huge proportions was present all the time." I could add another instance illustrative of this point in the case of a male child in whom marked tumefaction and fluctuation, over Poupart's ligament were discernible before constitutional symptoms presented themselves.

"Dr. Sands, in 1880, expressed a similar opinion, stating: Everything depends on an exact diagnosis, . . . . . and I would suggest a more frequent employment of the aspirator, as affording the most reliable test at our command."

Supposing that we have determined the seat of suppuration we must now ask ourselves which is the best course to

\**Perityphlitis*, By Robert F. Noyes, Transactions R. I. Med. Society, 1882.

pursue in order to secure its early and complete evacuation?

Here allow me to pause one moment to consider, if only synoptically, the history of the developments which have taken place in this branch of surgery from the earlier days of the timid and disastrous past to the present days of bold and, I am pleased to add, successful surgery.

There is no doubt that the dread of wounding the peritoneum has been one of the greatest drawbacks to the operative treatment of these abscesses ; add to this a faulty knowledge of the anatomy of the parts concerned in the formation of these abscesses and we will appreciate the reasons which deterred the earlier surgeons from interfering with the course of iliac phlegmons.

We may state in general terms that down to the middle of the present century or perhaps a little later, abscesses of the iliac fossa were permitted to progress without interruption to a spontaneous evacuation, or if any artificial opening was attempted it was always done when the discharge of pus through the skin was imminent.

It was not understood that in the majority of cases, when fluctuation or induration could be detected above Poupart's ligament, the purulent focus could be penetrated with impunity for it was not generally known that these purulent accumulations were, as a rule, altogether subperitoneal, and that the peritoneum was in most instances very effectually protected from invasion. In older days, an incision into the abdominal wall meant almost certain penetration of the peritoneum, to be followed by all its disastrous consequences. It was the peritoneum and always the peritoneum, which inspired that dreadful awe which, as we all know, has lingered to the present day and which has taken over a decade of the most aggressive abdominal surgery to overcome. All these factors doubtless combined to cause our older predecessors to look at these purulent collections with a timidity that would have been mortally shocked by the daring and, I am inclined to add, violent aggressiveness which is being continually displayed in the surgery of to day.

It was really not until MM. Husson and Dancé made known their splendid studies in this field in 1827, that the anatomy of the iliac abscesses was understood and the practicability of opening them through the abdominal wall, was made at all apparent. Still, we find that Dancé himself and other contemporary surgeons advised an expectant treatment and taught that these abscesses should be allowed to open spontaneously. Other surgeons followed after, who, appreciating the beneficial effects that would redound from operative intervention, practiced and maintained the old and healthy doctrine, *ubi pus ibi incisio*. Such was the practice of Dupuytren and subsequently that of the scholarly Velpeau whose lectures in iliac phlegmons could stand, even after the four decades that have swept over them, as models of magisterial teaching and observation.

The position of most surgeons since the days when the teaching of the great old school of French and English clinicians left such a deep impression on the medical mind of the world has been of a decidedly conservative character until the present decade, when the success which has attended the more daring procedures of American operators has inclined the surgeons of the day to a much earlier and more vigorous policy. The state of practice in Europe, especially during the last decennium, 1870-80, may be, perhaps, as well illustrated by the authoritative expression of the French surgeon Déspres\* as by that of any contemporary writer. "In principle," says Déspres, "abscesses of the iliac fossa, which have not passed the 15th day are never opened too soon; if so many misfortunes have been recorded up to this day, after opening such abscesses, it is simply because they have been opened too late." Here, then, we find a strong impression in favor of early evacuation, but still would the author have endorsed the plan of operating on such phlegmons even before *fluctuation* was detected, or what is more, even before suppuration has taken place, as Bull has recently done and recommended? Would this surgeon have advocated laparotomy for *subperi-*

\*Déspres, loc. cit. (Part 1.)

*toncal* (perityphlitic) phlegmons as a primary operation? No, we greatly doubt if he would have regarded any such procedure as rational, even at so late a period in medical history.

It is in this particular that American operators have inaugurated a new practice, i. e., the opening of these abscesses even before fluctuation can be detected, and also by the practice of laparotomy. The practice of opening an iliac phlegmon, the so-called *perityphlitic* especially, was suggested as early as 1856 by Dr. George Lewis, of New York, in his excellent essay "on abscesses and other diseases consequent upon the lodgment of foreign bodies in the appendix vermiformis."\* Though Dr. Lewis first advocated the early evacuation of subperitoneal (perityphlitic) abscess by an abdominal incision, as for ligature of the iliac artery, he really did not perform the first operation of this kind. Dr. Lewis himself gave the credit of the procedure to Mr. Hancock, of London, whose case was published in 1848 in the *London Medical Gazette*, and in the *American Journal of the Medical Sciences* in 1849. In commenting upon this case and the operation, Dr. Lewis says: "If resorted to at all, the opening should be made early. If the symptoms are urgent and threatening it must not be delayed on account of the absence of fluctuation."

Though it is true that the first recorded case of this operation was that performed by Dr. Hancock April 17, 1848, and recorded the same year, still it was Dr. Willard Parker, of New York, who first actually performed it. Dr. Parker operated by incision as early as 1843 but no record was made of it until 1867, when in the *New York Medical Record* of March 1st of that year Dr. Parker reported four cases, with dates, of this operation performed by himself. Dr. Parker said in this paper:

"In 1843 I was called in consultation to visit Dr. T., of Brooklyn. He had been confined to bed for some weeks suffering from pains in the bowels, constipation, disturbance of system, fever, tenderness in the right inguinal region,

\**New York Journal of Medicine*, 1856, November.

etc. On examination, I found a swelling in the neighborhood of the iliac fossa, in which questionable fluctuation existed. An opening of exploration was made which justified a free incision. I accordingly cut down into it, and evacuated the contents of the abscess; with the pus a little concretion the size of a raisin seed came out. In a short time the patient recovered, and is living now, in good health."

The operations reported by Dr. Parker at this time, together with an operation reported by Dr. J. H. Hobart Burge in the *New York Medical Record*, June 1st, 1867, (performed, however, by Dr. Parker) established as it were anew the propriety of this operation, and from New York as a centre and from Dr. Parker as a surgeon, the procedure became generally known and considered.

Thus it may be justly said that the operation for perityphlitic abscess is of American origin, and that Dr. Willard Parker was the operator.\*

In 1875 considerable attention was directed towards the operative treatment of perityphlitic abscess by the appearance of a valuable contribution from the pen of Dr. G. W. S. Gouley in the transactions of the State Medical Society of New York, in which this able surgeon strongly urged the general acceptance, by the profession, of Parker's operation. He reported in this paper the result of twenty-five reported cases which included Drs. Parker's and Hancock's cases, and those of Stiegler, L. Weber, Krackowitzer, Sands, Chs. Kelsey, S. B. Ward, Whitall, J. P. P. White, Gurdon Buck, J. R. Wood, J. C. Hutchison, Bontecon, Lea and Yonkers—in all twenty-five operations with two deaths.

These favorable reports certainly assisted in popularizing the operation as is proven by the valuable contributions that have since appeared. Among these I would mention as prominent American contributions to the literature of the subject, the papers by Dr. Sands (*Annals of the Anatomical Society of Brooklyn*, Vol. II, No. 7, 1880);

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\*Quoted from the valuable essay by Dr. Robert F. Noyes, on Perityphlitis, loc. cit.

by Dr. A. Vanderveer, of Albany, New York, 1880\*; by W. C. Wey, of Elmira, New York, 1880†; R. F. Noyes, 1882‡. But perhaps few of these have proved more suggestive and interesting than the recent article which Dr. William Bull has contributed in the *New York Medical Record* for 1886.

This contribution is certainly a brilliant illustration of that bold and practical spirit which has so emphatically individualized American surgery. It deals with exceptional clearness with some of the most vital points at issue in the surgery of "perityphilitic" abscesses, and as the representative of the most advanced opinions on the subject, I will not hesitate to quote them freely and repeatedly. In perityphilitic abscess (subperitoneal phlegmon), the great question has been to determine the proper time to operate. Bull says: "I have but one suggestion to make on this point, and that is, that in determining the time to operate, the duration of the illness should play a role subordinate to that of the results of exploration with the needle. It is certainly undesirable to operate early, when the pus may not have formed or the inflammation be going on to absorption. It is equally undesirable to defer the incision and subject the patients to the risks of an unfavorable course on the part of the pus. A sort of "time allowance" has been fixed by some surgeons. Gouley fixes the seventh or eighth day. [Parker, after the fifth day and before the twelfth.] Weber, not beyond the ninth or tenth. Sands, from the twelfth to the eighteenth day. [Désprés, at furthest the fifteenth day.] From this discrepancy it is obvious that the "time allowance" is of no use, and that it will be far wiser to be guided by the evidence afforded by the *needle exploration*."

The superiority of Parker's procedure over the old plan, which counseled expectation until excessive maturation of

\*Typhlitis and Perityphilitic. Reports of nine cases with remarks. *Transactions State Medical Society, New York, 1880.*

†Perityphilitis. Report of a case to which is appended a table of sixty cases with operations and results. *Transactions New York State Medical Society, 1880.*

‡Loc. cit.

the abscess had taken place, is now a fact established beyond all controversy.

In a summary of sixty cases from various sources in which early and late incision had been performed, Dr. W. C. Wey,\* of Elmira, N. Y., reported (1880) that forty-four recovered; twelve died; one left in poor health; three not stated.

In the carefully prepared paper of Dr. Noyes, of Providence, R. I., already mentioned, we find an analysis of one hundred cases of perityphlitis treated by operation; of these, eighty-five per cent. recovered. The mortality was but fifteen per cent. "In the sixty-seven cases collected by myself in 1872," says Bull, "where no early operation was done, the mortality was forty-seven per cent!"

"I have yet to hear of a single operation which has led to bad results. Even when no pus was found, the incision has proven of use in relieving the pain and fever and diminishing the tension and in directing the course of the pus to the surface. Several such cases have been reported. In one instance I found pus with the needle but could find none in incising the abdominal wall and none appeared subsequently except from the wound."

In regard to this opinion, I must disagree with the writer. I believe with Gouley that *too much haste* in cutting is not judicious as I cannot conceive of the necessity of making an open wound in any case simply to facilitate the outward course of a *future* purulent collection that may never form. Dr. Bull has already quoted a case from Dr. Noyes, which he refers to to illustrate the fact that even when marked constitutional symptoms are present an abscess may be aborted or absorbed (?).

Certainly it appears to me that the most judicious course is always to determine the presence of pus and when this is once found then not to delay in effecting its evacuation.

From the preceding remarks it is plain that *early* incision and evacuation tend by far toward the most successful issue in the treatment of subperitoneal (perityphlitic) iliac phleg-

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\* Loc. cit.

mons. In the subaponeurotic variety, when the diagnosis is well established, the danger of a spontaneous evacuation into the peritoneum is not as great, and consequently there is not as much risk in waiting. In fact, I believe that in some forms of advanced subaponeurotic iliac phlegmons in which the pus has descended from the lumbar region and has destroyed to a great extent the substance of the muscular and connective tissue under the iliac fascia, that evacuation by Dieulafoy's aspirator and the washing of the abscess cavity with iodoform ether (through the aspirator) as recently suggested by Verneuil\* in the treatment of cold abscesses may prove more advantageous as the drain from the enormous secreting surfaces presented by these very large cavities, when of long standing, is extremely exhausting. I must confess, however, that my inclinations would lead me in the treatment of most forms of iliac phlegmon, to follow the example of Andrews, of Chicago, *i. e.*, to evacuate *tuto et cito*, with the knife and to drain thoroughly and systematically as this eminently practical surgeon does in lumbar abscesses. It is very difficult to formulate definite guiding rules that can cover the exigencies of all cases, for each patient presents certain individual features that differentiate his case from that of others; but still, if I were asked to lay down some general rules I would say, as the result of my experience and of research:

1st. In all forms of *subperitoneal* iliac phlegmon, whether caused by intestinal lesion or otherwise, operate as soon as pus has been detected. Incise freely and drain thoroughly.

2d. In all forms of subaponeurotic phlegmon, whether the result of simple cellulitis, psoitis from strain, etc., incise freely and drain thoroughly if abscess is seen in its incipiency. Proceed more cautiously if abscess is seen late, and after great disintegration of tissue has taken place.

The question that now presents itself, and, doubtless with special force to the inexperienced practitioner, is, what is the best and safest way of reaching the abscess cavity in

\*Verneuil, *Revue de Chirurgie*, May, 1885.

the early stages of the disease? Of course, the greatest danger to be feared in attempting the early evacuation of the purulent focus when situated in the iliac fossa and above Poupart's ligament is the wounding of the peritoneum; the other risk incurred, is that of wounding important vessels which may give rise to serious hemorrhage. Either of these risks is reduced to a minimum, and, in fact, can hardly be incurred by any operator possessed of even a modicum of anatomical knowledge; but if either of these accidents should complicate any such operation, the protection offered by the Listerian dressing, on the one hand, and the facility of applying hemostatic measures on the other, ought to diminish the surgeon's liabilities to comparatively safe proportions. If we again consider the peculiar anatomical disposition of such abscesses (vide Part I.), even the most inexperienced should be reassured.

It should be remembered, as already stated, that perityphilitic abscesses, so-called, are, as a rule, subperitoneal, and that by the time the exploring needle has detected pus—which should be the indispensable prerequisite, the *sine qua non* to all operative interference—the pus and plastic exudation have removed the dangerous serous membrane from the path of the knife, and that in consequence the surgeon will not, in eight cases out of ten, even see or touch the peritoneum. Furthermore, by keeping the exploring needle *in situ* (after it has drawn pus) as a guide (Buck's method) and cutting down beside the needle the operator should have no trouble in reaching the purulent focus.

Now there are three incisions which may be required according to the situation of the focus of pus:

These may be either (a) above Poupart's ligament; (b) below Poupart's ligament, or (c) in the lumbar region above the iliac crest.

If the pus is detected above Poupart's ligament it will generally indicate a subperitoneal phlegmon and the only other purulent collections that could be mistaken for it would be either a circumscribed intraperitoneal

abscess, or a subaponeurotic abscess, that would have ulcerated its way through the iliac fascia and penetrated the subperitoneal space as in a case reported by Pfeufer, \* in which an abscess pointed above and below Poupart's ligament. But these conditions are exceptional, and even if they should exist and the case be not one of subperitoneal abscess, the treatment would be the same. Therefore, the aim of the surgeon should be to reach the areolar layer between the transversalis fascia and the peritoneum (Vide Pl. 4, Part I). In such a case an incision should be made above and parallel with Poupart's ligament and extending outwards towards the iliac crest. The incision can be made two, three, four or more inches according to the judgment of the operator. Dr. Parker recommended an incision four inches in length. Dr. Sands thinks the incision need not be more than 5.08 c. m. (two inches). After cutting through the external and internal oblique muscles and transversalis fascia with a director or without it, according to the self-reliance and ability of the operator, the knife should pause before the transversalis fascia and the surgeon see if any evidences of a pus focus are apparent. At this part of the proceeding, the hypodermic syringe should be introduced (if it has not been used as a guide) and a search made for the pus. If pus is found but not in immediate proximity with the transversalis fascia, this membrane may be carefully incised and the peritoneum examined. The peritoneum, of course, should not be penetrated under any consideration if presenting a healthy appearance and if there are evidences that the abscess is altogether extra-peritoneal. A careful search may be made for a purulent focus by carefully separating the peritoneum from its underlying connections but, as a rule, this is impracticable owing to the adhesions that bind together the transversalis fascia and the peritoneum as a result of inflammatory action.

In cases where the exudation can be felt above Poupart's ligament, the pus usually presents itself immediately upon

\*C. Pfeufer Obs. d'abcess bilobée passant au-dessus et au-dessous de l'arcade de Fallope.—*Gaz. Méd. de Paris* 1834.

reaching the transversalis fascia, so that the barest incision into it will cause the confined pus to escape freely.

In a case which I operated on last summer (1885), and already referred to in part I, when discussing the postural phenomena of iliac phlegmon, when the knife reached the transversalis fascia, the matter gushed forth in a copious stream seeming to tear its way through this softened aponeurosis as soon as the resistance of the muscular layer had been removed. As tending to still further elucidate the operative technique in very early abscesses the following details from a report of one of Dr. Bull's recent cases will prove instructive. In this case a "perityphilitic abscess was opened only *forty-eight* hours after the symptoms had become acute, and the patient took to bed. In this instance the operation was performed at an earlier moment than in any other case that has been recorded, and it was mainly through the instrumentality of the hypodermatic syringe and exploring needle, that this early recognition of pus formation was brought about. The needle, thrust to a depth of three inches directly backwards into the iliac fossa produced no pus; nor was any obtained when it was thrust in front of and behind this site. A longer needle was then pushed from a point behind and above the anterior superior spine, towards the middle of the fossa, a depth of four inches, and through the syringe was drawn very offensive and bloody pus. The incision was made a few hours later, under ether, above and to the outer side of Poupart's ligament. "The transversalis fascia was thickened and of a grayish color, the muscular layer absolutely healthy in appearance. An incision through the fascia evacuated about one ounce of pus, very dark from blood and of a characteristic odor. \* \* \* An elastic bougie showed that it extended from the centre of the incision, about two inches towards the symphysis, and three or four toward the lumbar region. The pain and fever disappeared the next day. In seven weeks the case was entirely well."

The only vessels that can be wounded in making the incision above Poupart's ligament, are the superficial and

deep epigastric and the circumflex ilii arteries. By keeping to the outer side of a line drawn from the middle of Poupart's ligament to the umbilicus, and by making the incision half an inch to one inch above the ligament, the arteries will be avoided.

If pus should be detected very deeply in the fossa and manifest a tendency to accumulate in its lumbar portion, a vertical incision can be freely made on the outer side of the erector spinae and quadratus lumborum just above the iliac crest, and the pus evacuated in this situation. This was Dupuytren's method, but it is rarely required and has proved unsatisfactory in practice.

If the needle should draw pus under the crural arch, close to the anterior and inferior iliac spine, then it is very probable that the case is one of infra-aponeuretic abscess. In such a case, the abscess, if acute, can be reached and evacuated by an incision made vertically and parallel with the femoral vessels, in the outer half of Scarpa's triangle. By this incision, which is known in Mexico as Chacon's incision (as it was first recommended by Prof. P. de Chacon of the Medical College of that city), the psoas and iliacus sheath can be readily explored and if any pus is confined under the iliac fascia it can be readily removed.

I believe we have run over the more salient and difficult features presented by the ordinary surgical treatment of acute iliac abscess and I will not burden your considerate attention by devoting any further consideration to the simple extra-peritoneal surgery of such abscesses. Nor will I speak of the after treatment of such cases, which, as every educated practitioner knows, should be conducted under the same principles that govern the antiseptic treatment of abscess cavities in other situations. I would only call attention to two points of some practical value in connection with the after treatment, and they are: first, that as a dressing, few agents can equal in value a mixture of iodoform and oil (3*i*-*ii* to 3*iv*), particularly in cases of fecal abscess; secondly, I cannot urge with too much emphasis, the great importance of rest in the final cure of iliac ab-

scesses. I have seen unfortunate results follow an impudent attempt to walk made by a patient shortly after an abscess had been incised.

In this case excessive suppuration followed this premature exertion which prostrated the patient exceedingly, and required a secondary operation to drain the cavity. It was only by dint of the greatest attention to his nutrition and other hygienic measures that that patient was saved.\*

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A brief survey of the surgical treatment of perforative ulceration of the caecum or of the vermicular appendix will not be out of order at the end of this commentary on the surgery of iliac abscesses. Ten years, and even five years ago, perforation of the bowel with fecal extravasation into the peritoneum or spontaneous evacuation of a so-called perityphilitic abscess into this cavity, would have enjoined the surgeon from all further operative interference and would have sounded the funeral knell of the patient. To-day the whole aspect of such cases has been changed simultaneously with the introduction and development of the operation of laparotomy for the treatment of intraperitoneal diseases. What in the past would have been regarded as a signal for discontinuance of treatment is regarded to-day as the signal for the most active and determined interference.

Dr. Noyes, in the admirable essay already referred to, says: "How shall we treat that great class of cases of perforation of the appendix vermiciformis in which there is no circumscribed collection of pus? It would be useless for me to enumerate or analyze the cases of this class which are recorded in great numbers in the medical journals. These cases are frequently insidious in their approach, and at least no urgent symptoms are present, till perforation has ensued, when severe localized, followed by general, peritonitis, collapse and death confront the physician. A

\*I am pleased to notice that in a very recent contribution to the subject read before the N. Y. Surgical Society, May 15, 1886, Dr. H. B. Sands lays great stress upon the subject of rest in the after treatment of perityphilitic abscesses.

number of years ago, I lost one such case ; a brother practitioner of this city has, to my knowledge, lost two ; another practitioner, a member of this society, suddenly and unexpectedly lost one ; and other members of this society can doubtless recall numerous other cases. For the relief of these cases, Dr. Byrd\* advocates abdominal section, the washing out of the peritoneal cavity, and the stitching of the perforated portion of the intestine to the edges of the wound. Dr. T. Herring Burchard, read before the New York Academy of Medicine, Nov. 18, 1880, a paper in which he advocated a transverse incision commencing 5:08 cm. (two inches), in front of the anterior border of the longissimus dorsi muscle, and extending forwards about 15.24 cm. (six inches), parallel and just above the crest of the ilium. Through this incision the caecum can readily be reached the abdominal cavity thoroughly cleansed, and the edge of the perforation stitched to the wound.

“ I have failed to find any recorded cases in which this procedure has been attempted. However plausible and important this operation really is, the difficulty of certainty of diagnosis will stand an almost insurmountable obstacle to its adoption. Medicine is useless in these cases, except for the production of euthanasia and surgery cannot even accomplish this.”

The remarks just quoted were written nearly four years ago (1882), and since that time great strides have been made in peritoneal surgery, which have tended to modify the rather pessimistic views taken by the writer. There is no doubt, however, that the majority of such cases are doomed to a fatal termination, even now, and that little hope can be entertained for the victims of this unfortunate complication.

But, still the success which has recently attended the operation of laparotomy in other forms of perforation of the bowel, accompanied by fecal extravasation, are much more encouraging than in the past.

No doubt can now be entertained as to the efficacy, and,

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\*Trans. Am. Med. Association, 1881, xxxi, 443.

in fact, necessity of laparotomy in cases of perforation of the intestine from gun-shot or other traumatic injuries. This question, in fact, has been definitely settled by the successful and brilliant results of late clinical experience. Nussbaum, Albert, Hueter, Gross, Berger and Zesas first sanctioned and encouraged this operation by their authoritative approbation, and the success which has attended the operations of Kocher, Bull, Hamilton, Dennis and G. Tilling, have finally given this operation a standing as generally recognized, as is that of laparotomy for diseased ovaries, etc.

Laparotomy for non-traumatic perforation, however, has not been so frequently done, and statistical data are meagre, but certainly since the last three or four years enough has been done to indicate progress to the extent of saving life, which is the best argument which could be urged in favor of the operation.

There are still some prominent surgeons who, like Beck, still cling to the opinion expressed by Noyes in 1882, and who prefer the nominal chances of a spontaneous recovery, assisted by rest, opium, diet, etc., but we believe that we would fairly state the opinion of the majority if we were to say that all cases of perforation of the intestinal tract, traumatic, or otherwise, with or without peritonitis, should, as a rule, be operated on by laparotomy, excepting, of course, those cases in which the patient is manifestly in a lethal collapse. This is at present the opinion of Leyden, Landau, Litten, Israel, Kuh, Rydygier, Miculicz, and almost the whole school of modern German surgeons.

In this country the very recent papers by Bull\* and Sands,† of New York, Homans,‡ of Boston, and McFarland Gaston,§ of Georgia, could tend to show a decided agreement between our trans-Atlantic brethren and ourselves.

\*Bull, loc. cit.

†Sands, loc. cit.

‡Homans, New York Medical Record, May 1, 1886.

§Gaston, Surgical Relations of Ileo-Cæcal Region. Trans. Am. Med. Asstn., Med. News, May 29, 1886.

Prof. J. Miculicz\* in a very recent communication read before the fifty-seventh meeting of German naturalists in Magdeburg reviews this subject thoroughly and presents the histories of three very interesting cases in which laparotomy was performed for non-traumatic perforation of the bowel. Of these three cases, two died and one recovered.

The first case was that of perforating ulcer of the stomach with extravasation of contents into the peritoneum, in a male adult, aged 25-30. This patient was seen in an advanced state of collapse. Death supervened three hours after the operation, which consisted in abdominal section, closing the perforation with sutures, and washing the peritoneum.

The second patient was an adult aged 49, who suffered with suppurative peritonitis consequent upon a perforation of the appendix vermiciformis with fecal extravasation. Laparotomy was performed in this case but the site of the perforation was not discovered, consequently the appendix was left undisturbed. The peritoneum was washed thoroughly and much pus removed from the cavity. Patient improved considerably but finally succumbed five days after in consequence of fresh extravasation.

Miculicz believes that if the perforated veriform appendix had been excised and the opening in the cæcum closed, the inflammatory symptoms would have subsided and the patient would have recovered.

The third case a male æt. 40 presented symptoms of intestinal obstruction and peritonitis. The diagnosis of seropurulent peritonitis caused by intestinal incarceration was made. Laparotomy was performed 72 hours after commencement of illness, and after all remedial measures failed two pints of offensive smelling purulent matter escaped; intestines adherent. Pieces of undigested potato in peritoneum and other evidences of perforation present. Perforation found in small intestine in left side just above crest of ilium. Perforation sutured. Abdomen closed after

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\*I am indebted for an admirable abstract of Miculicz's report and many references, to an admirable editorial review in the *Annals of Surgery* for May, 1886, by C. J. Coles, to which I would especially refer my readers.

thorough toilette had been done. Notwithstanding serious complications patient *recovered* and left hospital eleven weeks after operation. The perforation was due in this case according to Miculicz to typhous ulcer.

Litten observed a case similar to the third case of Miculicz. "The operation was performed by Schroeder. There were symptoms of circumscribed peritonitis in the right iliac fossa and a subcutaneous phlegmon with partial gangrene of the cutis. The intestine was found perforated and the opening closed. Recovery took place in five weeks, a fistula in the lower part of the abdominal wound, however, remaining. Billroth operated in a case of perforation of the sigmoid flexure caused by a foreign body (paint brush). The patient already greatly collapsed, died the same day. A case described by Chaput greatly resembles Miculicz's second case. The abdomen was closed after about 400 grammes of fecal smelling pus had escaped. Death fifteen minutes later. The autopsy showed that the vermiform appendix was perforated by an intestinal calculus."

In all these cases the laparotomy was performed by median incision.

In another case of perforation of appendix vermiformis and evacuation of perityphilitic abscess reported by Dr. Sands in his recent paper before the New York Surgical Society, lateral laparotomy was performed by an incision over the seat of trouble. In this case death supervened four hours after the operation. In the report which furnished an abstract of this paper, the details are not fully given and I am not certain yet whether the pus which had been extravasated into the peritoneal cavity had been removed or not.

I have found a reference to the effect that in 1875 Dr. Edmond Dulin Laughlin, of Orleans, Indiana, performed a laparotomy for the relief of a perityphilitic abscess from which forty-five ounces of pus were discharged; the particulars of this remarkable case have not been published, as I have nowhere found a record of the details of the op-

eration. If a *real* laparotomy was performed in this case it would not only be the first case of its kind on record west of the Alleghanies as claimed for this operation, but it would be the first of its kind on record anywhere.\*

It is very probable, however, that this laparotomy was simply an oncotomy, or, in other words, only an incision through the abdominal wall into the cavity of a subperitoneal abscess which had projected above the iliac crest and had contracted adhesions to the abdominal wall. It might have also been an encysted intraperitoneal abscess without communicating with the general peritoneal cavity. It should be always borne in mind that by the term laparotomy is meant not simply a section through the abdominal wall, but that the general peritoneal cavity has been penetrated, invaded. The only authenticated case, which has come to my knowledge, in which laparotomy has been intentionally and deliberately performed with the view of evacuating a perityphilitic abscess—extra-peritoneal—is the remarkable case recently reported by Dr. John Homans, of Boston, in the *Medical Record* for May 1st, 1886, and which he operated on January 11th. In this case laparotomy was performed four days after the patient had taken to bed, or five days after the first symptoms of illness. The patient was a boy, eleven years of age, never robust. On the fourth day there was dullness on percussion over the right iliac and lumbar regions, with the center of tenderness about one and a half inch above the anterior spine of the illum. .... “Laparotomy was performed at this point. No spray used. An incision about two and a half inches long was made, and the peritoneum opened; a healthy bowel presented itself. On passing my finger below and behind the presenting loops, I felt coils of intestine filled with faecal masses, or perhaps enlarged glands. The loops of intestine were adherent to each other by a recent plastic process, but by poking about with my finger and separating them, I opened an abscess, and about two ounces or more

\*See Atkinson's *Physicians and Surgeons*, of the United States, page 343, Philadelphia, 1878.

of foul smelling ("rotten-egg") pus welled up out of the wound. As far as we could we prevented the pus from running in among the coils of intestine, and after emptying the abscess as well as possible, a double drainage tube was passed into its cavity and the incision closed around the india rubber tube. Three weeks after the operation the boy sat up and he is now well. Temperature was never higher than  $102.9^{\circ}$ ."

This case I regard as extraordinary, and certainly no one will deny that the course of the operator was itself remarkable. The abscess in this instance is admitted to be extra-peritoneal, and the area of inflammation is pretty well made out by percussion dullness. Notwithstanding this, no attempt is made to localize the purulent focus by needle exploration, and the operator decides upon cutting directly into the peritoneum and searching for the abscess "by poking about with the finger." This he succeeds in finding, but not before he has partially spilled the pus into the peritoneum. The operator also admits that, "If I had operated just below the kidney in the right loin, I should have hit the right spot, and perhaps this would have been better surgery in point of drainage and as not opening the peritoneum." It appears to me that with such evidence before us, and considering that in all probability all these points could have been readily determined prior to the operation, such an exceedingly severe procedure as laparotomy was uncalled for, and that the operator in this case overstepped the boundaries that prudence and fore-thought for the patient would have counselled. Certainly Dr. Homans may say, "All's well that ends well," but if his patient should have died in consequence of a generalized septic peritonitis, I cannot see how he could have escaped the just censure that would have followed. In making this criticism I am prompted by no carping or fault-finding spirit, and surely not towards Dr. Homans, whose superior merit as a laparotomist and operator I have long ago learned to appreciate, but it does appear to me that no operation should be allowed to go by without protest when it is involved in

unnecessary risk to the patient, and when it could have been supplanted by another procedure which would have been practically as beneficial and emphatically less dangerous. The reports of these successful cases are by far more dangerous to the prestige of an operative procedure than fatal cases, because they tend directly to stimulate the incautious and enthusiastic, and usually the unskilled, to the performance of similar feats whose dangers are only appreciated until the lives of the patients have paid the price of the lesson. Let us hope, then, that laparotomy, which has before it so broad a field of utility, will not be tarnished by the disastrous consequences that would follow its general adoption as the operation for *extra-peritoneal* "perityphlitic" abscesses.

Abscess in the pelvic cavity in the female especially, even if extra-peritoneal, is a very different matter, for there are forms of suppuration which are in no other way accessible to the knife than by laparotomy.

Lawson Tait, and Martin, of Berlin, were the first who attempted to prevent the terrible contingencies of pelvic inflammation by attacking the disease at its original seat. Lawson Tait, removed the suppurating uterine appendages, Martin operated for suppurating periuterine hæmatocoele. Tait operated for suppurating hæmatoma of the right Fallopian tube with peritonitis in 1878; and he removed both tubes for pyosalpinx and an ovary for abscess in 1885. Martin, in 1885, performed laparotomy in three cases of intraperitoneal hæmatoma, i. e., retro-uterine hæmatocoele. He opened the peritoneal cavity, incised the sac, and evacuated the bloody pus; he drained into the vagina through the pouch of Douglas and closed the opening he had made into the sac from the peritoneal cavity by sutures. Since then the cases of Feldman of Gothingen (1880), Baumgartner (1882), and others which in 1883, summed up to 50 or 60 reported cases (Fenger), in which laparotomy had been resorted to and often with success, proved that this operation was perfectly justifiable in certain forms of pelvic suppuration.

But to return to the subject of laparotomy in connection

with cæcal disease. We would now say in concluding this article that the indications for the performance of abdominal section depend almost entirely on the diagnosis. The cases of cæcal disease in which laparotomy is indicated plainly, are :

1st. Disease of the appendix with ulceration, perforation and extravasation ; in these cases the sooner the diagnosis is made and the earlier the operation, the better will be the result for the patient.

2d. In disease of the cæcum such as perforating ulcer with extravasation, the indications are precisely as in the preceding case.

3d. In obstruction and impaction due to foreign bodies in the vermicular appendix and cæcum, with threatened ulcerative perforation ; if the diagnosis could be made prior to the advent of "perityphilitic" inflammations and peritonitis, the operation should be performed. But early diagnosis is here practically impossible.

4th. In cases of abscess (perityphilitic) which empty into the peritoneum, abdominal section should be performed immediately upon the recognition of this event.

This I believe sums up all the indications for laparotomy in connection with the *inflammatory* diseases of the cæcum and its appendix that could present themselves in practice. It is plain that in these cases the difficulty of making an early diagnosis presents an unsurmountable obstacle to the success of laparotomy, and for this reason doubtless Bull and Sands have especially called attention to the question whether in cases of disease of the cæcum or appendix, it would not be more advantageous to perform laparotomy *ab initio*, than the ordinary operation.

There can be no doubt that in many cases in which the appendix is seriously diseased that the safest plan would be to remove it, just as a gynecologist would not hesitate to remove an ovary that threatened or endangered the life of its possessor. But who is to determine the exact nature of the disease affecting the cæcum or appendix? Shall we simply say let us perform an exploratory laparotomy and then decide what course to pursue? It is difficult to answer this question decidedly, for notwithstanding

the great progress accomplished, it is dangerous to lay down guiding principles on so serious a question. Still, the great risks incurred by delay in the inflammatory forms of cæcal disease, and the almost lethal prostration which follows fecal or purulent extravasation into the peritoneum would lead me to accept as a safe proposition the fourth conclusion arrived at by Gaston in his study of the surgical relations of the ileo-cæcal region,\* viz: [Serious] "*Disorders involving the peritoneum, when not promptly relieved by general treatment, warrant exploratory opening of the abdomen.*"

Too much stress cannot be laid, however, on the necessity of a close and thorough examination of the patient, and of mature deliberation on the part of the operator before deciding upon the performance of this operation. There is no doubt that the medical world is at present laboring under a serious laparotomy epidemic and that this really great and beneficent operation is often unnecessarily practiced, and too often, perhaps, *because it is the fashion*, as Verneuil would say. As has been said by a recent commentator, it is not borne in mind that it is still a most dangerous thing to open the abdominal cavity. The small percentage of mortality attained by such men as Keith, Tait, Bantock, Schede and Thornton, is the result in part of an extraordinary manual dexterity which few possess naturally and fewer still ever can get the opportunity to acquire. There are very few men who really understand even the *technique* by which the operation is made so free from danger. The laparotomies of most American and English surgeons are attended by a comparatively high mortality, and serious harm has been done by the wide heralding of the extraordinary success of a few adepts. No, the time has not yet come when all laparotomists can conscientiously repeat the words of Tait and say: "Our experience has justified our opening that sacred sac (the peritoneum) very much as we open our pockets."

There is yet considerable difference between the results of these two operations.†

\*J. McF. Gaston, loc. cit.

†N. Y. Medical Record, for June 5th, 1886.